PROPOSED

COVERED SOURCE PERMIT RENEWAL REVIEW - *0218-01-C*
Application No. 0218-03

Applicant: Gay and Robinson, Inc.

Mailing Address: Gay and Robinson, Inc.
P. O. Box 156
Kaumakani, Hawaii 96747-0156

UTM Coordinates: 434,600 meters east; 2,424,208 north (Zone 10)

Responsible Official: Mr. E. Alan Kennett
President
(808) 335-3133 ext. 222

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SIC Code: 0133, sugarcane farms

Proposed Project:
The subject application is for the renewal of Gay and Robinson's title V permit. Gay and Robinson operate a sugar cane processing facility located at Kaumakani, Kauai. The primary combustion equipment at the facility consists of a 182 MMBtu/hr bagasse/oil-fired boiler (hereinafter known as "main boiler"), A 6.695 MMBtu/hr seed plant boiler, and two (2) 400 kilowatt (kW) emergency diesel engine generators. The main boiler was installed in 1965, which predating the March 1972 Clean Air Act permitting requirements. The initial title V permit for this facility (CSP No. 0218-01-C) was issued on January 2, 1998, with a subsequent modification issued on February 7, 2001. Emission rates from the primary combustion equipment exceeds the major stationary source threshold of 100 tons per year, so the facility is considered a major stationary covered source. The facility is not proposing any modifications to the existing permit that increase emissions above currently permitted levels.

Sugar cane is grown on the fields in the vicinity of the processing facility. The cane is harvested mechanically, and transported to the processing facility by truck. At the processing facility, the cane is unloaded and cleaned of mud and debris. The cane is then transported by conveyor to a shredder, where it is chopped, shredded, and crushed using a two-roll crusher and four mills. The cane residue after crushing (bagasse) is conveyed to a storage area and is used for fuel in the main boiler. The capacity of the cane crushing system is 120 tons per hour.

Fuel for the main boiler includes bagasse and fuel oil no. 2. The steam generated from the main boiler is used for sugar processing and for generating electricity. The seed plant boiler is fueled with either fuel oil no. 2 or specification used oil. Gay and Robinson, continues to operate the main boiler so as to meet the definition of a biomass boiler.

Insignificant activities at the facility consist of six above ground storage vessels used to store gasoline, used oil, fuel oil no. 2, and two (2) 400 KW standby generators fired on fuel oil no. 2 to provide back-up power.

The cane juice extracted in the mill is sent to the boiling house where it is weighed, heated, clarified by settling, evaporated and crystallized into sugar by boiling. The product is then centrifuged to separate sugar crystals from molasses. The sugar and molasses are stored separately and shipped to a sugar refinery in California.

The rating of the main boiler is 130,000 pounds per hour of steam, when fired on bagasse. The seed plant boiler has a maximum design rating of 6.695 MMBtu per hour (200 horsepower). There are no proposed operational limitations for the facility. The dispersion modeling reflects the worst case scenario based on 8,760 hours per year of operation.

The primary emissions from the facility consist of particulate matter (PM) and typical products of fossil fuel combustion such as sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO) and volatile organic compounds (VOC). Minor amounts of compounds listed as Hazardous Air Pollutants (HAP) are also emitted. The main boiler exhausts through a single stack, 22.04 meters tall. The seed plant boiler stack is 4.0 meters tall.

Initial control of particulate matter from the main boiler is provided by a multi-clone mechanical dust collector which uses the principal of centrifugal force to separate the particulate from the exhaust gas. Additional particulate control is then provided by a wet scrubbing system where the exhaust gas is contacted with water sprays. No controls are in place on the seed plant boiler. Fugitive particulate emissions from roads and material stockpiles are reduced by water sprays.

Monitoring of emissions from the main and seed plant boilers are done through recordkeeping of fuel usage by type and applying approved emission factors.

Equipment:
The permitted combustion equipment consists of the following:

- The main boiler is a water-tube boiler manufactured by Combustion Engineering-Superheater, Inc, Model VU-50X. It has a design capacity of 130,000 pounds of steam per hour when firing bagasse. The boiler fires a combination of bagasse and fuel oil no. 2. The maximum fuel rate is 70,000 pounds per hour of bagasse and 200 gallons per hour of fuel oil no. 2. The boiler typically operates for 48 weeks per year, and exhausts to a single stack.

- The seed plant boiler is manufactured by Orr and Sembower, Model Powermester H-3. The rated design heat input is 6.695 MMBtu. The seed plant boiler can be fired on fuel oil no. 2, or specification used oil. It has a maximum fuel use of 44.3 gallons per hour.

- Tank 3 is a 28 feet in length by 8 feet in diameter, 10,500 gallon above ground storage tank holding fuel oil no.2. The tank dimensions and capacity are required to be is “readily accessible” pursuant to Federal regulations.

Air Pollution Controls:
Pollution control for the main boiler consists of a mechanical dust collector and cyclonic wet scrubbers. The mechanical dust collector is manufactured by Zurn Industries, Inc, Model MTSA-224-9CYT-XD-NR-TA. The design capacity is 178,000 ACFM at 600° F. The multi-throated wet scrubbers are manufactured by the Crews Evaporator and Drier Company. The average water use is 500 gallons per minute. The design flow rate is 224,000 ACFM. The vendor guarantee is an efficiency of 98 percent to two microns.

There is no air pollution control device on the seed plant boiler.

Applicable Requirements:
Hawaii Administrative Rules (HAR).
Chapter 11-59 Ambient Air Quality Standards
Chapter 11-60.1 Air Pollution Control
- Subchapter 1 General Requirements
- Subchapter 2 General Prohibitions
  - 11-60.1-31 Applicability
  - 11-60.1-32 Visible Emissions
  - 11-60.1-33 Fugitive Dust
  - 11-60.1-36 Biomass Fuel Burning Boilers
  - 11-60.1-38 Sulfur Oxides from Fuel Combustion
  - 11-60.1-39 Storage of Volatile Organic Compounds
- Subchapter 5 Covered Sources
- Subchapter 6 Fees for Covered Sources, Noncovered Sources, and Agricultural Burning
  - 11-60.1-111 Definitions
  - 11-60.1-112 General Fee Provisions for Covered Sources
  - 11.60.1-113 Application Fee for Covered Sources
  - 11.60.1-114 Annual Fees for Covered Sources
- Subchapter 8 Standards of Performance for Stationary Sources
  - 11.60.1-161 New Source Performance Standards
- Subchapter 9 Hazardous Air Pollutant Sources
- Subchapter 10 Field Citations

New Source Performance Standards (NSPS):

40 CFR Part 60, Subpart Kb, *Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for which Construction Commenced after July 23, 1984*.

40 CFR 60, Subpart Kb applies to volatile organic liquid storage vessels constructed after July 23, 1984, and have a capacity equal to or greater than 40 cubic meters. Therefore, tank 3 is subject to this requirement. However, the capacity of the tank is less than 75 cubic meters, and therefore the tank is exempt from a majority of the requirements for Subpart Kb. The only requirement for tank 3 is that the permittee must keep readily accessible records showing the dimensions of this tank and an analysis of the tank capacity.

Consolidated Emissions Reporting Requirements (CERR):
Estimated annual emission levels do not exceed the thresholds that would require annual reporting. The subject facility will be required to report annual emissions once every three years.

Non-Applicable Requirements:
With the exception of tank 3, all of the other storage tanks at the facility are not subject to 40 CFR 60 Subpart Kb based on their date of construction and/or capacity. The main boiler and seed plant boilers are not subject to the NSPS for electrical steam generation units (40 CFR 60 Subpart Da) or industrial/commercial boilers (40 CFR 60 Subpart Db) because of their date of construction. The boilers are also not subject to Fossil Fuel Fired Steam Generators (40 CFR 60 Subpart D) because the heat input rate is less than 250 MMBtu/hr for each boiler. National Emission Standards for Hazardous Air Pollutants (NESHAPS) also does not apply because there have been no standards promulgated for boilers to date.

Compliance Assurance Monitoring
The purpose of Compliance Assurance Monitoring (CAM) is to provide a reasonable assurance that compliance is being achieved with large emissions units that rely on air pollution control device equipment to meet an emissions limit or standard. Pursuant to 40 Code of Federal Regulations, Part 64, for CAM to be applicable, the emissions unit must:

1. be located at a major source;
2. be subject to an emissions limit or standard;
3. use a control device to achieve compliance;
4. have potential pre-control emissions that are 100% of the major source level; and
5. not otherwise be exempt from CAM.

The main boiler is exempt from CAM because it isn't subject to an emission limit or standard for the pollutant in question (PM). The seed plant boiler is exempt from CAM requirements because none of the criteria apply.

Best Available Control Technology (BACT) Requirements:
A BACT assessment is required for new or modified stationary sources. The subject facility is an existing source with no proposed changes. Therefore, a BACT assessment is not required.

Insignificant Activities/Exemptions:
The facility includes several volatile organic liquid storage tanks that are exempt from permitting requirements, as presented in Table 1. Pursuant to HAR, §11-60.1-82(f)(1), tanks 1, 2, 4, 5, and 6 are exempt from permitting requirements of capacities less than 40,000 gallons. Tank. 3 is required to keep readily accessible records showing the dimensions of this tank and an analysis of the tank capacity pursuant to 40 CFR §60.116b(b). Other insignificant activities consists of 2 emergency generators, as listed on Table 2. These generators are exempt based upon their size/rating and/or estimated emissions pursuant to regulations regarding standby generators (HAR, §11-60.1-82(f)(5)).

Table 1: Insignificant Fuel Storage Tanks

Tank No.	Tank Description	Tank Size (gal)	Product Stored
1	Auto Fuel (Gasoline)	6,000	Gasoline
2	Specification Oil	7,000	Used Oil
3	No. 2 Oil	10,500	Fuel Oil No. 2
4	High Sulfur Diesel	6,000	Fuel Oil No. 2
5	Low Sulfur Diesel	6,000	Fuel Oil No. 2
6	Fuel Oil No. 2	500	Fuel Oil No. 2

Table 2: Standby Generators

Manufacturer	Model	Capacity	Fuel Type
Onan	450 DRW	400 KW	Fuel Oil No. 2
Onan	450 DRW	400 KW	Fuel Oil No. 2

Alternate Operating Scenarios: None.

Project Emissions:
The facility emissions result primarily from the main boiler. The seed plant boiler has much smaller emissions. The type and amount of emissions varies with the type of fuel. Gay and Robinson has identified worst case emission scenarios for both short-term (pounds per hour) and annual average (tons per year) periods. The main oil boiler operates for 11 months per year.

Insignificant emission sources consist of two standby diesel engine generators and six above-ground storage tanks.

The maximum short-term (3-hr & 24-hr) particulate matter emissions occurs when the main boiler is burning a combination of bagasse and fuel oil to achieve maximum steam production. For long-term (annual) emissions, the main boiler must derive half of its annual heat input from bagasse (biomass) to qualify as a biomass boiler. Thus, the heat input from bagasse must be at least 50 percent of the total boiler heat input when calculating annual emission and concentration levels.

The seed plant boiler may burn fuel oil No. 2 with a maximum sulfur content of 0.5% by weight, or specification used oil.

Emissions may be estimated by multiplying the fuel use amount by an appropriate emission factor. Documentation provided by the applicant states a maximum fuel consumption of 2,000 gallons per hour for the main boiler and 44.3 gallons per hour for the seed plant boiler. Emission factors, and their sources, are presented in Table 3.

Table 3: Emission Factors

Source	Fuel	Pollutant	Factor	Unit	Reference
Main Boiler	**Bagasse**	PM	0.0008	lb/lb fuel	Source test
		SO_2	N/A	N/A	No factor identified
		NO_x	0.0006	lb/lb fuel	AP-42, Table 1.8.1 (10/96)
		CO	N/A	N/A	No factor identified
		VOC	N/A	NA	No factor identified
		POM	5.00E-07	lb/lb fuel	AP-42, Table 1.8.1 (10/96)
		Formaldehyde	N/A	N/A	No factor identified
		Antimony	N/A	N/A	No factor identified
		Arsenic	N/A	N/A	No factor identified
		Beryllium	N/A	N/A	No factor identified
		Cadmium	N/A	N/A	No factor identified
		Chromium	N/A	N/A	No factor identified
		Cobalt	N/A	N/A	No factor identified
		Lead	N/A	N/A	No factor identified
		Manganese	N/A	N/A	No factor identified
		Mercury	N/A	N/A	No factor identified
		Nickel	N/A	N/A	No factor identified
		Selenium	N/A	N/A	No factor identified

Table 3: Emission Factors

Source	Fuel	Pollutant	Factor	Unit	Reference
	Fuel Oil No. 2	PM	2	lb/1000 gal	AP-42, Section 1.3 (9/98)
		SO_2	142(S)	lb/1000 gal	AP-42, Section 1.3 (9/98)
		NO_x	20	lb/1000 gal	AP-42, Section 1.3 (9/98)
		CO	5	lb/1000 gal	AP-42, Section 1.3 (9/98)
		VOC	0.2	lb/1000 gal	AP-42, Section 1.3 (9/98)
		POM	22	lb/1000 gal	AP-42, Section 1.3 (9/98)
		Formaldehyde	319	lb/1000 gal	AP-42, Section 1.3 (9/98)
		Antimony	N/A	N/A	No factor identified
		Arsenic	4.2	$lb/10^{12}$ Btu	AP-42, Section 1.3 (9/98)
		Beryllium	2.5	$lb/10^{12}$ Btu	AP-42, Section 1.3 (9/98)
		Cadmium	11	$lb/10^{12}$ Btu	AP-42, Section 1.3 (9/98)
		Chromium	57.5	$lb/10^{12}$ Btu	AP-42, Section 1.3 (9/98)
		Cobalt	N/A	N/A	No factor identified
		Lead	8.9	$lb/10^{12}$ Btu	AP-42, Section 1.3 (9/98)
		Manganese	14	$lb/10^{12}$ Btu	AP-42, Section 1.3 (9/98)
		Mercury	3	$lb/10^{12}$ Btu	AP-42, Section 1.3 (9/98)
		Nickel	176	$lb/10^{12}$ Btu	AP-42, Section 1.3 (9/98)
		Selenium	N/A	N/A	No factor identified
Seed Plant Boiler	**Fuel Oil No. 2**	PM	1.08	lb/1000 gal	AP-42, Section 1.3 (9/98)
		SO_2	142 (S)	lb/1000 gal	AP-42, Section 1.3 (9/98)
		NO_x	20	lb/1000 gal	AP-42, Section 1.3 (9/98)
		CO	5	lb/1000 gal	AP-42, Section 1.3 (9/98)
		VOC	0.34	lb/1000 gal	AP-42, Section 1.3 (9/98)
		POM	22	lb/1000 gal	AP-42, Section 1.3 (9/98)
		Formaldehyde	319	lb/1000 gal	AP-42, Section 1.3 (9/98)

Table 3: Emission Factors

Source	Fuel	Pollutant	Factor	Unit	Reference
		Antimony	N/A	N/A	No factor identified
		Arsenic	4.2	lb/10^{12} Btu	AP-42, Section 1.3 (9/98)
		Beryllium	2.5	lb/10^{12} Btu	AP-42, Section 1.3 (9/98)
		Cadmium	11	lb/10^{12} Btu	AP-42, Section 1.3 (9/98)
		Chromium	57.5	lb/10^{12} Btu	AP-42, Section 1.3 (9/98)
		Cobalt	N/A	N/A	No factor identified
		Lead	8.9	lb/10^{12} Btu	AP-42, Section 1.3 (9/98)
		Manganese	14	lb/10^{12} Btu	AP-42, Section 1.3 (9/98)
		Mercury	3	lb/10^{12} Btu	AP-42, Section 1.3 (9/98)
		Nickel	176	lb/10^{12} Btu	AP-42, Section 1.3 (9/98)
		Selenium	N/A	N/A	No factor identified

Emissions may be calculated using the following formula:

$$[(FC1 \times EF) + (FC2 \times EF)] \times (1 - CE)$$

Where:

FC = fuel use or heat rating for each fuel type
EF = emission factor, by fuel type
CE = control efficiency, if any

The estimated maximum emissions for each boiler is exhibited in Table 4.

Table 4: Estimated Emissions

Emission Point		Air Pollutant	Emission Rate	
Unit No.	**Equipment Name/Description**	**Regulated or Hazardous Air Pollutant (CAS#)**	**Pounds/Hour**	**Tons/Year**
001	**Main Boiler - 2,000 kW - Bagasse and Fuel Oil No. 2**	PM_{10}	2.82E+01	60.5
		Total Particulate	3.33E+01	7.12E+01
		NO_x	7.80E+01	1.01E+02
		POM	8.27E+01	7.72E-02
		CO	1.00e+01	4.38e+01
		VOC	3.60E-01	1.5768
		SO_x	1.28E+02	3.55E-01
		Formaldehyde (50-00-0)	7.29E+02	2.03E+00
		Arsenic (7440-38-0)	2.12E-05	5.88E-08
		Beryllium (7440-41-7)	1.26E-05	3.50E-08
		Cadmium (7440-43-8)	5.54E-05	1.54E-07
		Chromium (7440-47-3)	3.38E-04	9.38E-07
		Lead (7439-92-1)	4.49E-05	1.25E-07
		Manganese (7439-96-5)	7.06E-05	1.96E-07
		Mercury (7439-97-6)	1.51E-05	4.20E-08
		Nickel (7440-02-0)	9.07E-05	2.52E-07
002	**Seed Plant Boiler - 200 HP - 100% Used Oil**	PM_{10}	8.33E-01	9.40E-02
		Total Particulate	9.58E-01	1.08E-01
		NO_x	2.44E+00	2.75E-01
		CO	2.22e-01	9.70e-01
		VOC	1.24E-02	1.40E-03
		SO_2	1.39E+01	1.57E+00
		HCl	2.93E-01	3.30E-02
		POM	3.72E-01	0.042
		Formaldehyde (50-00-0)	1.80E+01	2.03E+00

Table 4: Estimated Emissions

Emission Point		Air Pollutant	Emission Rate	
Unit No.	Equipment Name/Description	Regulated or Hazardous Air Pollutant (CAS#)	Pounds/Hour	Tons/Year
		Arsenic (7440-38-0)	1.75E-03	1.97E-04
		Beryllium (7440-41-7)	2.81E-05	3.17E-06
		Cadmium (7440-43-8)	1.33E-03	1.50E-04
		Chromium (7440-47-3)	3.49E-03	3.94E-04
		Lead (7439-92-1)	2.44E-02	2.75E-03
		Cobalt	8.87E-04	1.00E-04
		Manganese (7439-96-5)	3.02E-03	3.40E-04
		Mercury (7439-97-6)	2.14E-04	2.42E-05
		Nickel (7440-02-0)	1.55E-02	1.75E-03
		Selenium (7782-49-2)	2.55E-04	2.87E-05

Facility-wide emissions are exhibited in the following table:

Table 5: Summarized Annual Emissions

Pollutant	Bagasse Boiler Emissions (TPY)	Seed Plant Boiler Emissions (TPY)	Total Emissions (TPY)
PM_{10}	6.05e+01	9.40e-02	6.06e+01
Total Particulate	7.12e+01	1.08e-01	7.13e+01
NO_x	1.01e+02	2.75e-01	1.01e+02
CO	4.38e+01	9.70e-01	4.48e+01
VOC	1.58e+00	1.40e-03	1.58e+00
SO_x	3.55e-01	1.40e-03	3.56e-01
POM	0.00e+00	4.20e-02	4.20e-02
HCl	0.00e+00	3.30e-02	3.30e-02
HAPS			
Formaldehyde (50-00-0)	2.03e+00	2.03e+00	4.06e+00
Arsenic (7440-38-0)	5.88e-08	1.97e-04	1.97e-04
Beryllium (7440-41-7)	3.50e-08	3.17e-06	3.21e-06
Cadmium (7440-43-8)	1.54e-07	1.50e-04	1.50e-04

Table 5: Summarized Annual Emissions

Pollutant	Bagasse Boiler Emissions (TPY)	Seed Plant Boiler Emissions (TPY)	Total Emissions (TPY)
Chromium (7440-47-3)	9.38e-07	3.94e-04	3.95e-04
Cobalt	0.00e+00	1.00e-04	1.00e-04
Lead (7439-92-1)	1.25e-07	2.75e-03	2.75e-03
Manganese (7439-96-5)	1.96e-07	3.40e-04	3.40e-04
Mercury (7439-97-6)	4.20e-08	2.42e-05	2.42e-05
Nickel (7440-02-0)	2.52e-07	1.75e-03	1.75e-03
Selenium (7782-49-2)	0.00e+00	2.87e-05	2.87e-05
Total HAPS			4.07e+00

Air Quality Assessment:
The facility is an existing covered source and is not proposing any modifications that would impact emissions. Therefore, a new ambient air quality assessment is not required for the permit renewal.

Significant Permit Conditions: None

Other Issues: None

Conclusions and Recommendations:
The facility is compliance with all applicable state and federal requirements. It is recommended that the Covered Source Renewal Permit be issued with the appropriate requirements upon completion of a thirty (30) day public comment period and a forty-five (45) day EPA review period.

Kevin Kihara
January 30, 2004